

CLAIMS

I claim:

1. A fluid cleaner utilizing a fluid flow comprising:

fluid delivery means; and

5 a toroidal vortex nozzle, said nozzle comprising an inner tube and an outer tube;

wherein a fluid flow through said nozzle has substantially the characteristics of a toroidal vortex wherein said toroidal vortex creates a low pressure region to attract matter.

10 2. A fluid cleaner in accordance with claim 1 further comprising wheels.

3. A fluid cleaner in accordance with claim 1 further comprising a brush.

15 4. A fluid cleaner in accordance with claim 1 further comprising a rotating brush.

5. A fluid cleaner in accordance with claim 1 wherein the distal end of said toroidal vortex is rectangular.

20 6. A fluid cleaner in accordance with claim 1 wherein the annular duct formed between said inner tube and said outer tube is vented.

7. A fluid cleaner in accordance with claim 1 further comprising a watertight housing.

8. A fluid cleaner in accordance with claim 1 wherein said fluid cleaner is capable of traversing a surface.

9. A fluid cleaner in accordance with claim 1 further comprising a traction motor.

5 10. A fluid cleaner in accordance with claim 1 wherein said fluid flow is generated by an impeller.

11. A fluid cleaner in accordance with claim 1 wherein said fluid flow is generated by a centrifugal pump.

12. A fluid cleaner in accordance with claim 1 wherein said fluid flow is generated by a propeller.

13. A fluid cleaner in accordance with claim 1 further comprising a collector.

14. A fluid cleaner in accordance with claim 1 further comprising a collector, wherein the pressure in said collector is greater than in said centrifugal separation means.

15. A fluid cleaner in accordance with claim 1 further comprising centrifugal separation means.

16. A fluid cleaner in accordance with claim 1 further comprising:

20 centrifugal separation means; and
 a removable collector.

17. A fluid cleaner in accordance with claim 1 further comprising:

centrifugal separation means; and

a collector.

18. A fluid cleaner in accordance with claim 1 further comprising:

5 centrifugal separation means;
 a collector; and
 a removable plug in said collector.

19. A fluid cleaner in accordance with claim 1 further comprising:

10 centrifugal separation means;
 a collector; and
 a door in said collector.

20. A fluid cleaner in accordance with claim 1 further comprising:

15 centrifugal separation means; and
 a collector;

wherein the pressure in said collector is greater than in said centrifugal separation means such that a cylindrical fluid flow inside said centrifugal separation means is maintained without preventing matter from traveling into said collector.

21. A fluid cleaner in accordance with claim 1 wherein said fluid cleaner effects a recirculating fluid flow.

22. A fluid cleaner in accordance with claim 1 wherein said fluid cleaner performs a sealed operation.

23. A fluid cleaner in accordance with claim 1 wherein said fluid cleaner operates in a pool.

5 24. A fluid cleaner in accordance with claim 1 wherein said fluid cleaner traverses a surface submerged in a fluid.

25. A method of cleaning surfaces submerged in a fluid comprising the steps of:

attracting matter with a flowing fluid;

10 centrifugally separating said matter from said fluid; and
recirculating said fluid.

26. A method according to claim 25 wherein attracting said matter occurs in a toroidal vortex nozzle.

27. A method according to claim 25 further comprising the step
15 of loosening said matter from said surface.

28. A method according to claim 25 further comprising the step of loosening said matter from said surface with a brush.

29. A method according to claim 25 further comprising the step of loosening said matter from said surface with a rotating brush.

20 30. A method according to claim 25 wherein said attracting is performed by a toroidal vortex fluid flow.

31. A method of separating matter from a fluid comprising the steps of:

centrifugally separating said matter from said fluid; and
recirculating said fluid through a toroidal vortex nozzle.

32. A method in accordance with claim 31 further comprising the
step of brushing a surface to loosen matter from said surface.

5 33. A method in accordance with claim 31 further comprising the
step of:

brushing a surface to loosen matter from said surface; and
attracting said matter with said toroidal vortex nozzle.

34. A method in accordance with claim 31 wherein said fluid is
pool water and said matter is in said pool water and on the
submerged surfaces of a pool.